
NASA's Mission Operations and Communications Services

**This Description applies only to proposals in response to
NASA's Announcement of Opportunity for Medium-class Explorers
(MIDEX) and Missions of Opportunity**

AO 01-OSS-xx

June 2001

This document is intended to assist in the preparation of proposals in response to an Announcement of Opportunity (AO) issued by NASA's Office of Space Science (OSS) for Medium-class Explorers (MIDEX) and Missions of Opportunity. NASA provides many operations and communications services that are available for NASA missions. The use of these services will incur costs to the user and estimates for these costs need to be included in proposals submitted under this AO. To facilitate proposal preparation, proposers are to read this appendix and contact the individuals named in Section 1.6 below.

- in anticipation of formal NASA-wide full-cost accounting,
- to better manage our currently oversubscribed communications resources,
- to encourage tradeoffs between on-board processing and storage vs. communications requirements, and
- to encourage proposers to design hardware and operations systems which minimize life cycle costs while accomplishing the highest-priority science objectives.

If the Enterprise and SOMO agree that the project or PI approach does not result in the lowest life cycle cost, the Enterprise may direct the project/PI to modify their approach. If the SOMO approach increases the project/PI cost but reduces cost to the Enterprise, any funding impacts to the project/PI will be resolved by the Enterprise.

If SOMO and the Enterprise can not agree on which alternative is more cost effective, the Space Operations Council will resolve the issue.

NASA has consolidated management of space mission operations, space-ground communications, and ground wide area networks under SOMO at the Johnson Space Center. Consolidation of these systems, including the Deep Space Network (DSN), the NASA Ground Network (GN), the Tracking and Data Relay Satellite System (TDRSS), the NASA Information Services Network (NISN), and mission operations systems, was performed to enable migration to a common architecture across the agency, eliminate redundancy, and share resources. The ultimate objective is to reduce the cost of operations and increase funding available for science. Most space operations services are provided through a Consolidated Space Operations Contract (CSOC), with some selected services (e.g., international DSN sites) managed by NASA Centers.

<http://www.jsc.nasa.gov/somo/>

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Table 1: Summary of SOMO Services

Mission Services:	
SOMO Service Category	Brief Description
Mission Planning	<p>Advanced mission analysis supporting mission design and service selection decisions</p> <p>Development of documentation which specifies launch vehicle, spacecraft, crew, payload, ground system, and network activities during the various phases of mission preparations and operations</p> <p>Preparation of test plans and monitoring of readiness test and training activities</p> <p>Support of critical/key event execution during the pre-launch, launch, and critical early orbit phases of the mission</p>
Flight Operations	<p>Operation of spacecraft and instruments</p> <p>Health and safety monitoring</p> <p>Performance analysis and anomaly resolution</p> <p>Command management</p> <p>Scheduling of spacecraft-ground communications</p>
Flight Dynamics	<p>Navigation services, encompassing spacecraft trajectory determination and control, including trajectory design and maneuver planning, as well as supporting physical modeling</p> <p>Attitude services, including spacecraft attitude determination and control, sensor modeling and calibration, and attitude reference modeling services</p> <p>Launch trajectory services, involving real-time ascent-phase trajectory monitoring, acquisition support, and associated pre-launch preparations and simulations</p>
Science Data Processing	<p>Data ingest from Space Network (SN), Ground Network (GN), Deep Space Network (DSN), or commercial sources</p> <p>Frame synchronization</p> <p>Error detection and correction (including Cyclic Redundancy Check (CRC)), Pseudo-Random Noise (PN) decoding, and Reed-Solomon decoding</p> <p>Forward time-ordering of data</p> <p>Redundant data deletion</p> <p>Product generation from Level 0 through higher levels if required</p> <p>Electronic distribution of data products (hard media distribution may be arranged with extra cost for packing and shipping)</p> <p>Physical Media</p> <p>Data reprocessing and/or redistribution</p> <p>Note: Some mission requirements that typically have significant impact on system design and/or operations staffing are data format, data volume, complexity of processing, data distribution characteristics, reprocessing frequency, and data latency requirements. Services may be performed using a data processing system that currently exists or a system that is provided by the customer.</p>

1.4 Process for Requesting Services

1.5 Standards

International Telecommunications Union (ITU)
National Telecommunications and Information Agency (NTIA)
Consultative Committee for Space Data Systems (CCSDS)

Information about the ITU and NTIA regulations can be obtained from the NASA Management Office at the Glenn Research Center or by consulting References 1 and 2. Recommended standards applicable to DSN, Ground Network, or TDRSS support can be obtained from Reference 3, the CCSDS home page.

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Prospective users of SOMO and TMOD facilities can obtain additional information from the following documents:

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